

# Emerging Environmental Issues

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# Trends relevant to small business

- Environmental Assistance and Outreach

- One-stop shop
- Customer service for
- Technical assistance



- Regulatory reform / simplification

# On the horizon

- Indoor air
- Vapor intrusion
- Nanotechnology
- Nanobiotechnology
- Biochar

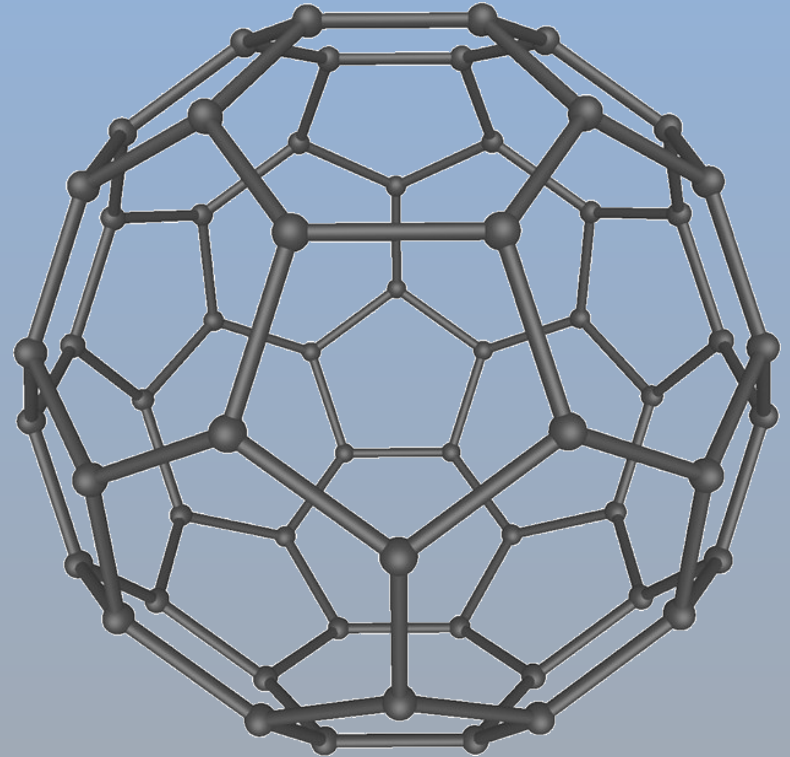


Image from Wikipedia.org  
<http://en.wikipedia.org/wiki/File:C60a.png>

# What is Biochar?

- Fine-grained, highly porous charcoal

Feedstock



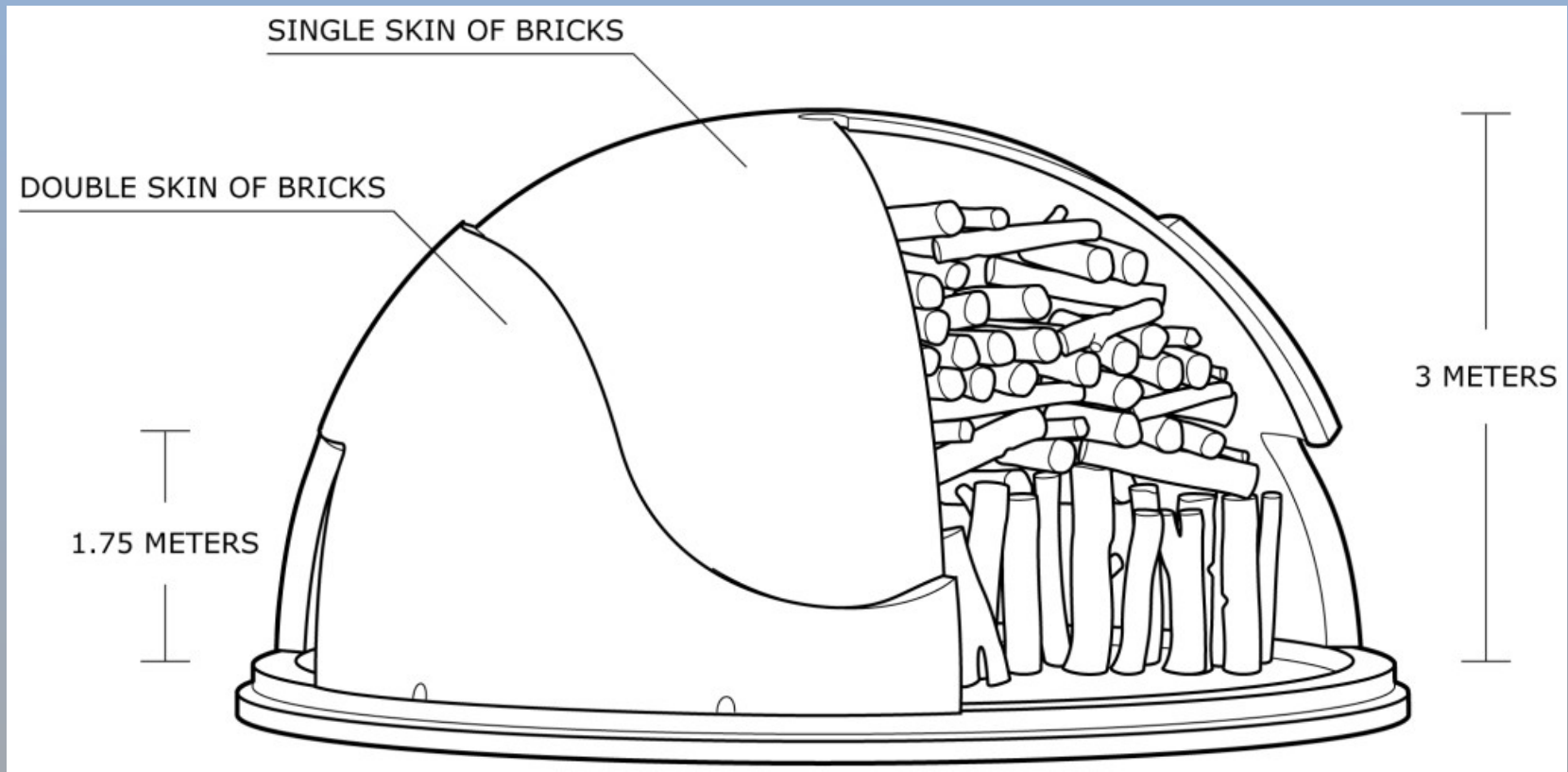
Biochar

Image from USDA, Agricultural Research Service,  
<http://www.ars.usda.gov/Research/docs.htm?docid=22205#Biochar>

# How we used to make charcoal



# Pyrolysis—heating biomass and limiting oxygen



# How is Biochar produced?

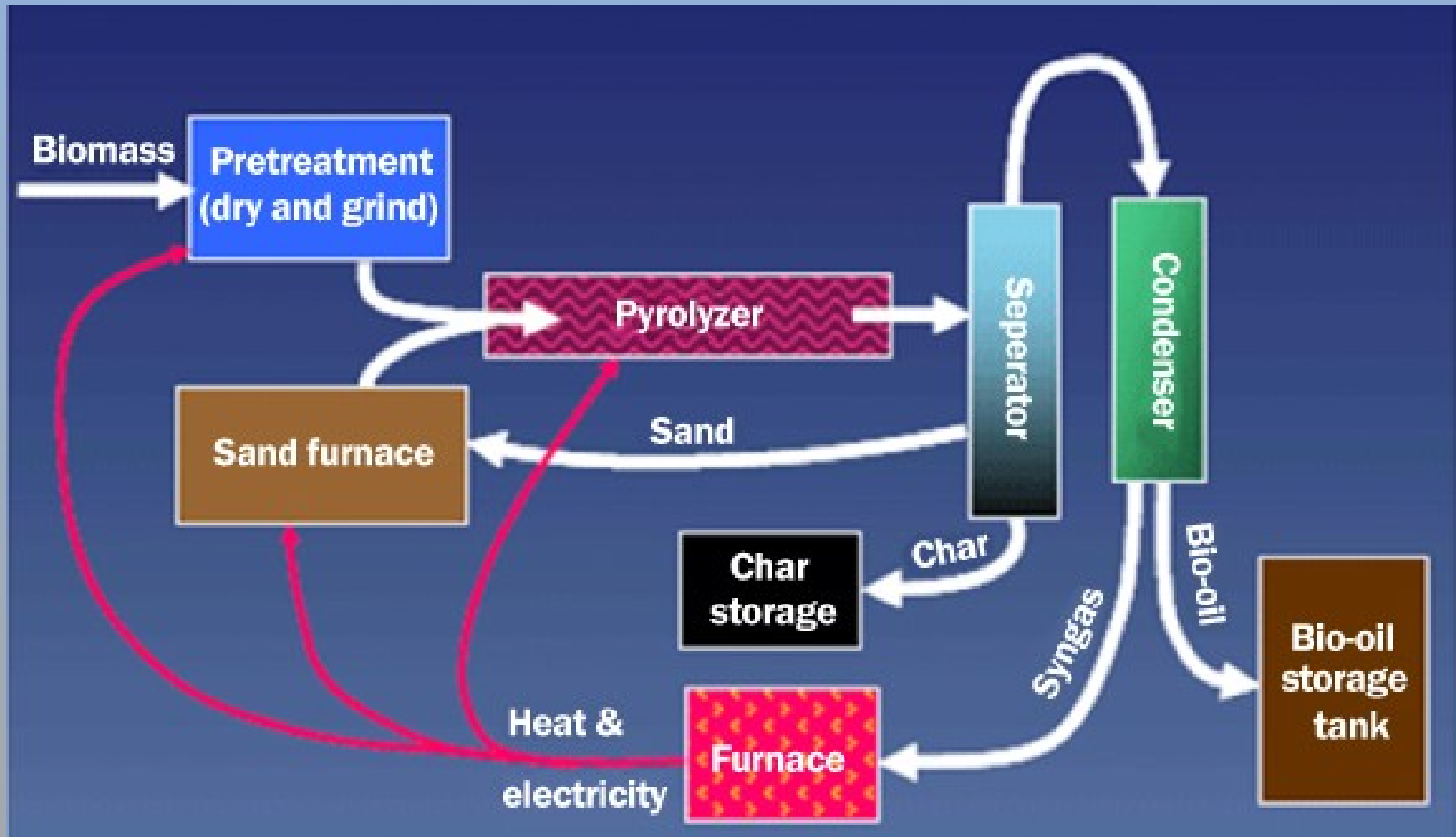


Image from USDA, Agricultural Research Service,  
<http://www.ars.usda.gov/Main/docs.htm?docid=19898>

# What do you do with pyrolysis?

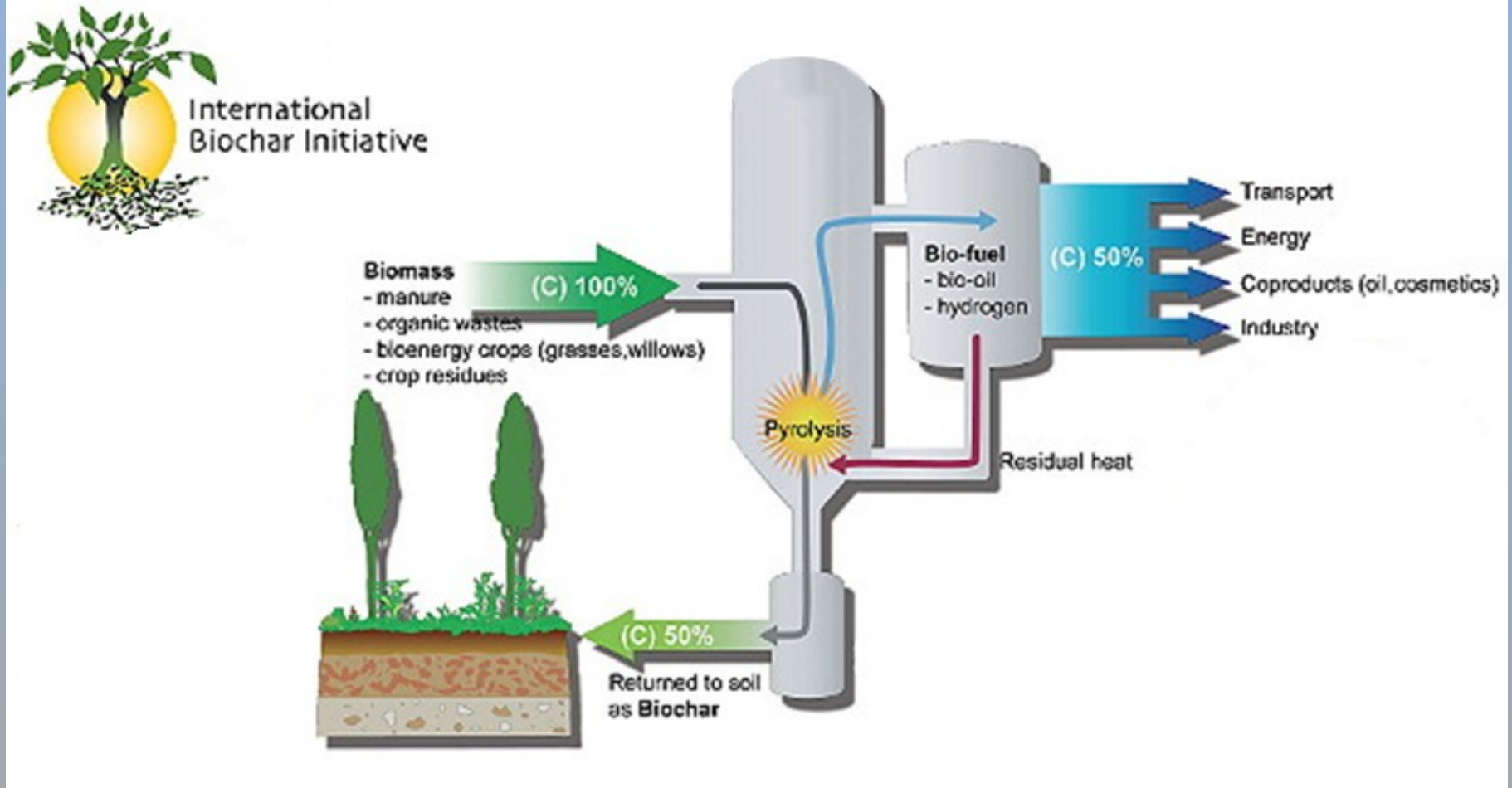


Image from International Biochar Initiative,  
<http://www.biochar-international.org/>

# Biochar as a Soil Amendment

- Improves water retention
- Improves nutrient retention
- Protects water quality in nearby surface waters
  - Reduces nutrient runoff
  - Reduces fertilizer use



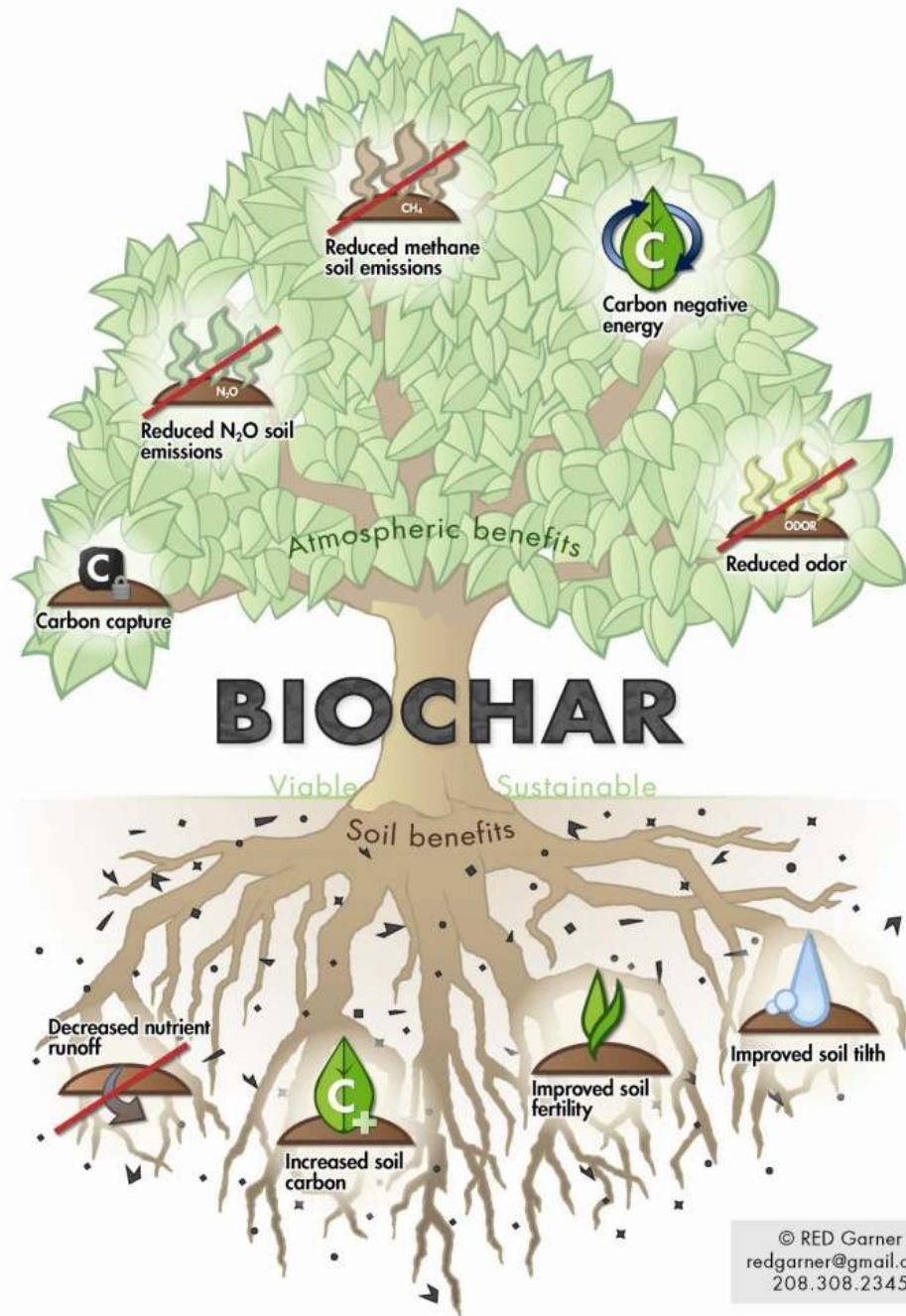


Image from  
International  
Biochar Initiative,  
<http://www.biochar-international.org/biochar>

# Biochar's impact on the Carbon Cycle

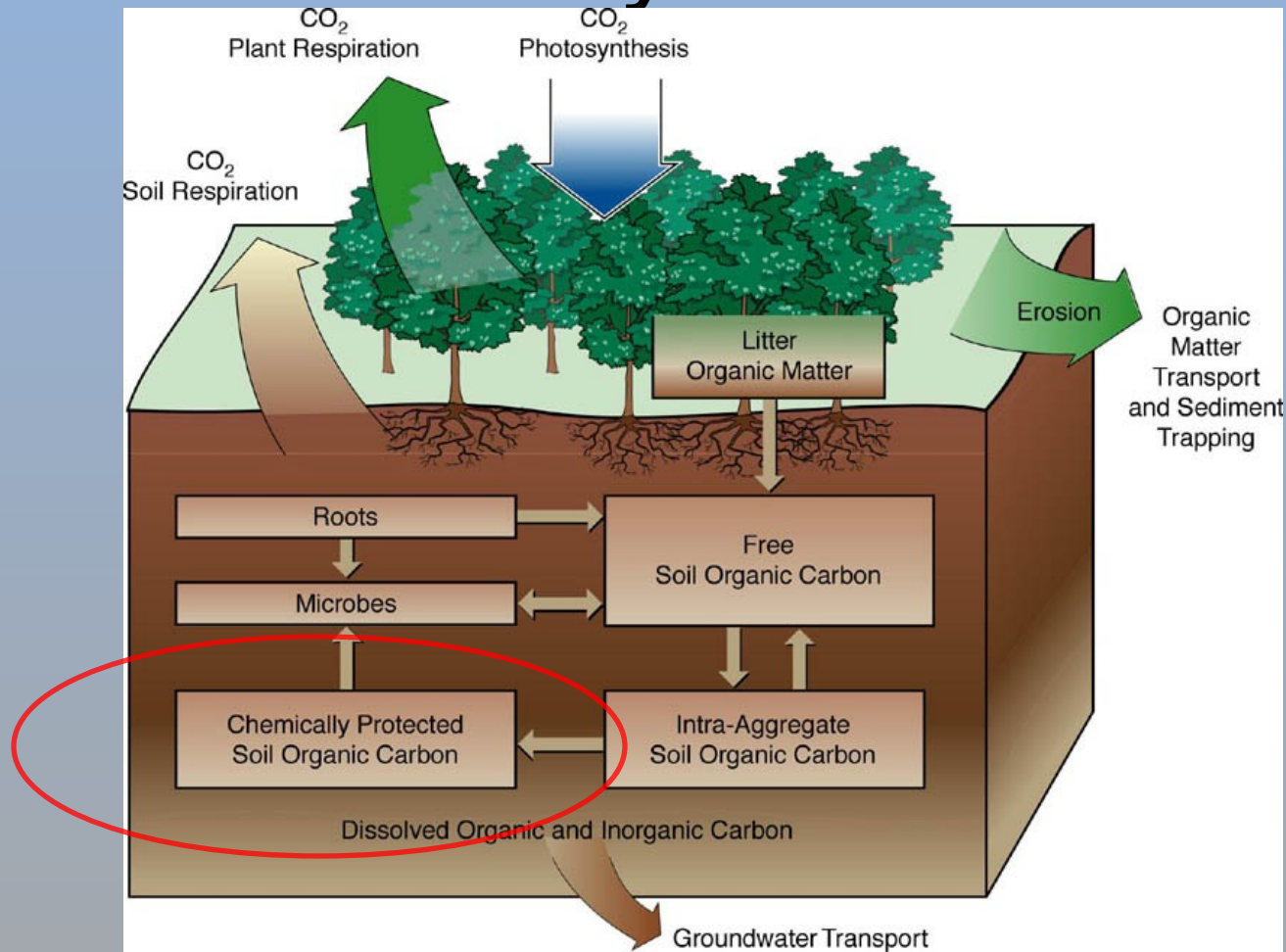


Image from U.S. Climate Change Science Program,  
<http://www.climatechange.gov/Library/stratplan2003/final/graphics/images/SciStratFig7-5.jpg>

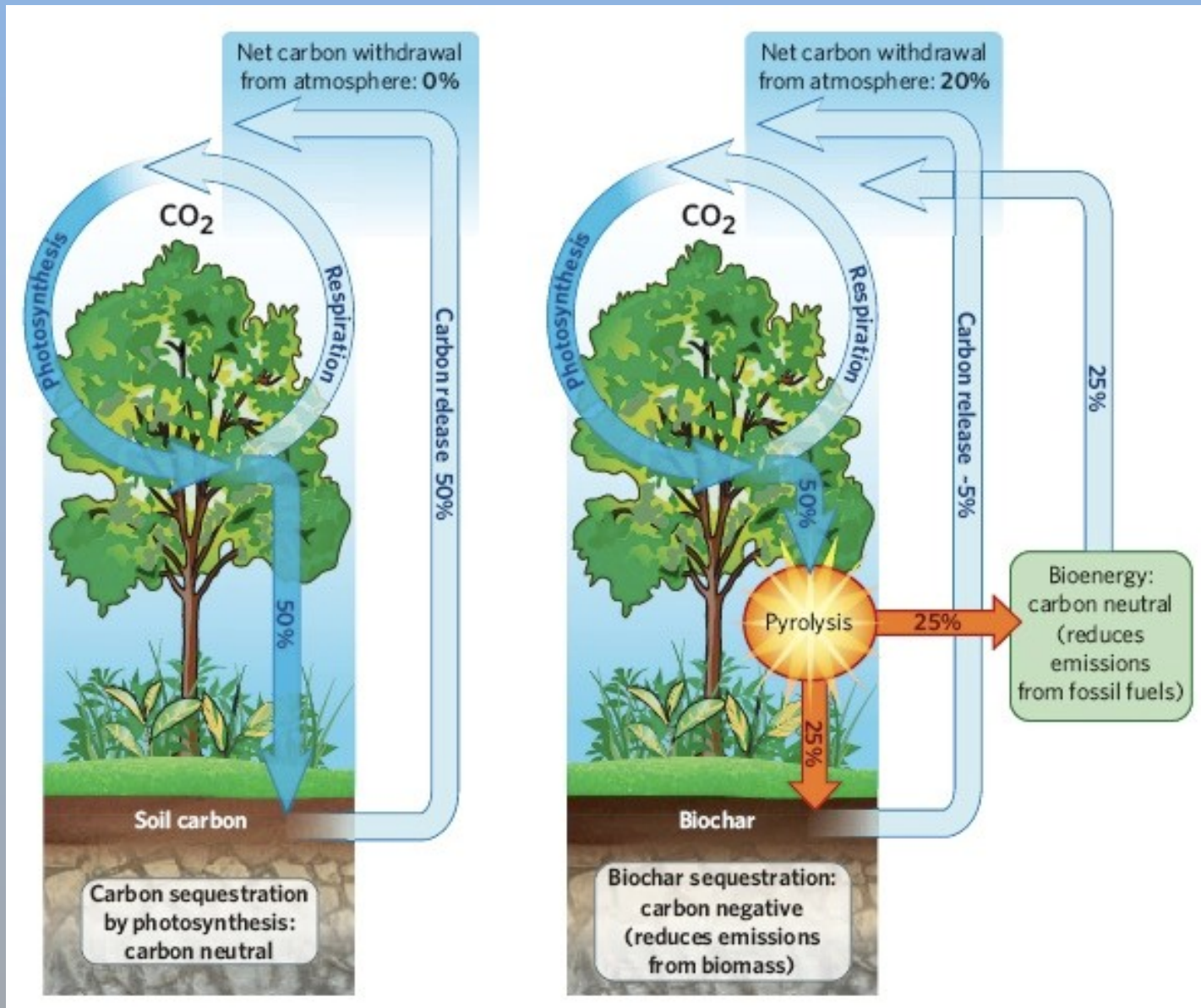


Image from Johannes Lehman, 447 Nature (May 2007)

# Biochar in North Carolina

- Southeast is leader in biochar research
  - N.C. State
  - USDA research center
  - N.C. Farm Center for Innovation and Sust.



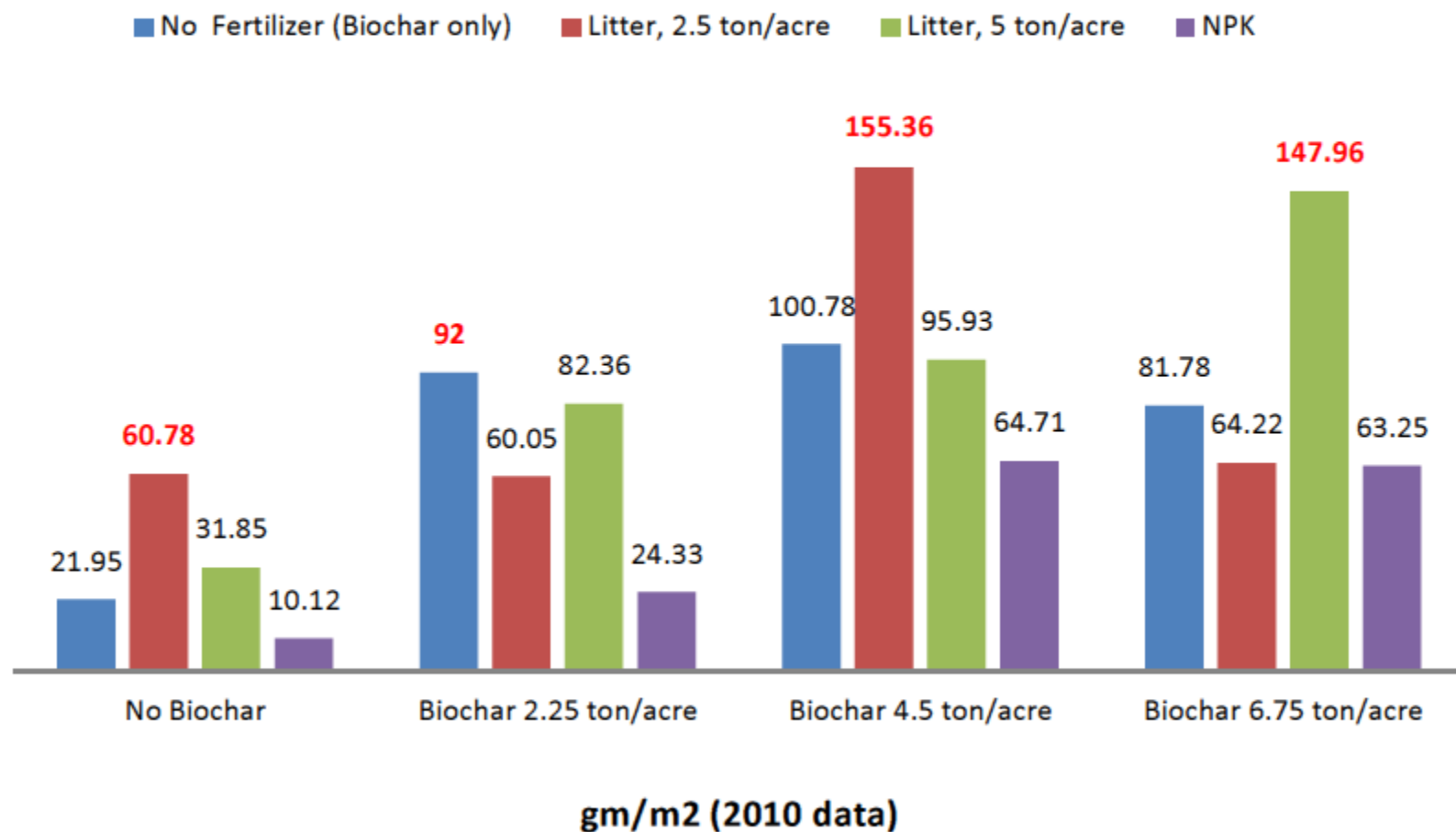
2011

# Biochar Trials

USDA-NRCS Grant Award Program

A comprehensive study of the effects of biochar on crop yields as it relates to sandy soils in eastern North Carolina.

## Soybean Biomass Weight as a Function of Biochar and Respective Amendments



# Next steps for biochar

- Standards for biochar
  - Feedstock, Process, Application
- Credits for direct sequestration
- Credits for secondary effects

Questions?